



**CALIFORNIA BOARD FOR
PROFESSIONAL ENGINEERS AND
LAND SURVEYORS**

GEOTECHNICAL ENGINEER EXAMINATION

Information for Examinees

October 2003

Examination Information and Administration

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Examination Information and Administration

Introduction

The mission of the Board for Professional Engineers and Land Surveyors is to safeguard the public from incompetent practice. As set forth in the Professional Engineers License Act, the Board is mandated by the State Legislature to test all applicants for licensure as Geotechnical Engineers on their ability to apply his or her knowledge and experience and to assume responsible charge in the professional practice of geotechnical engineering. The Board accomplishes this mandate by setting forth examination standards to reliably determine those applicants who are competent to provide safe services to the public.

This brochure provides information specific to the California Geotechnical Engineering Examination. The Geotechnical Engineering Examination consists of an 8-hour examination administered in one day. Applicants for licensure as a Geotechnical Engineer must hold a current and valid California license as a Civil Engineer and pass the California Geotechnical Engineering Examination to become a “Geotechnical Engineer” in California. The Board recommends retaining this brochure for future reference.

Examination Description

The California Geotechnical Engineering Examination is comprised of approximately 45% multiple-choice and 55% design/essay type questions. Candidates will record their answers to multiple-choice items on a machine-scoreable answer sheet. Calculations needed to solve a multiple-choice item **must** be performed in the multiple-choice test booklet. Candidates are provided individual solution booklets for each design problem. A candidate’s solutions and answers to a design problem must be included in the designated solution booklet to be graded. Candidates will be allotted four hours to complete the morning (a.m.) portion and four hours to complete the afternoon (p.m.) portion. The morning session will consist only of multiple-choice problems and the afternoon session will consist only of design problems.

The subject matter of the Geotechnical Engineering Examination relates to the principles and practice of geotechnical engineering. Candidates are tested on elements of current geotechnical engineering practice as dictated by an occupational analysis. The candidate’s knowledge of geotechnical engineering principles, method of solving the problems, and reasoning ability as demonstrated in the candidate’s solutions for design problems will be tested. Candidates should develop solutions with calculations, findings, and statements arranged in a professional, organized, and legible manner. A definition of key words used in the design/essay problems on the exam is provided in Appendix F.

The specific content of the examination is reflected in the California Geotechnical Engineering Examination Test Plan (See Appendix A) which was updated in December 2001.

Examination Locations

Approximately two weeks prior to the scheduled examination date, candidates are notified by mail of the location and time to appear for the examination. Testing sites are located in the Northern, Central and Southern areas of California. Candidates who do not live in the immediate areas of a testing facility must expect to travel to the assigned testing facility. Candidates are assigned to test sites according to the zip code included in their address of record. Not all examinations are administered at each examination site, therefore, you may not be scheduled at the site nearest your address of record. You may request to be scheduled at a specific site offering your discipline of examination by writing to the Board at least thirty days prior to the examination date.

Examination Procedures and Materials

To be admitted to the test site, candidates must present their admission notices and at least one form of photo identification to the examination proctors. You **must** have a Photo ID to be admitted to the test site. There will be no exceptions. (See Photo Identification)

Candidates are responsible for bringing their own materials in and out of the testing room. The amount of material a candidate may bring into the testing room is limited to what they can transport in **one trip**. Once candidates are inside the testing area, they will not be permitted to leave the facility for any reason until they have completed their examinations.

Thirty to sixty minutes are allotted for lunch between morning and afternoon examination sessions. **Candidates should bring their own food and beverages.** No eating, drinking, or smoking is allowed in the testing area.

Unauthorized individuals will not be permitted into the testing area, and candidates must vacate the testing room after each examination session. Candidates will be allowed to exit the testing facility once they have finished the examination, however, candidates are not allowed to exit the testing facility during the first sixty minutes or the final ten minutes of the examination.

Candidates should bring the following materials with them to the examination *in addition* to reference materials (a suggested reference list is in Appendix B): a supply of sharpened #2 pencils, non-QWERTY keypad calculator, and drafting materials such as triangles, a straightedge, compass and scales. Any calculating/computing device having a QWERTY keypad arrangement (that is a keypad which is similar to a typewriter or a keyboard) will NOT be allowed for the exam. These devices include, but are not limited to, palmtop, laptop, handheld or desktop computers, calculators, databanks, data collectors, and organizers. If you have a question regarding your calculation device, you may call the Board prior to the date of the examination.

Photo Identification

To gain entrance into the examination, photo identification is required and you will **NOT** be admitted without it. Identification will **ONLY** be accepted if it meets **ALL** of the following criteria:

1. Issued by a state or federal government agency (including other U.S. states and foreign countries). Student identification cards or employee identification cards will **NOT** be accepted.
2. Contains your photograph.
3. Contains your signature.
4. Contains your *typed* name.

If you do not have identification that meets **ALL** of the above criteria, you will not be allowed to sit for the examination. **THERE WILL BE NO EXCEPTIONS.**

Special Accommodations

The Board is in full compliance with the Americans with Disabilities Act (ADA). All requests for special accommodations must be made in writing to the Board at least thirty days prior to the examination date. A “Disability Form”, which must be completed by you and your physician, will be sent to you upon request. Documentation must be signed by a physician on appropriate letterhead. Requests for special accommodation because of religious practices must include documentation in order to substantiate the request. Documentation must be signed by your religious leader on the appropriate church, temple or synagogue letterhead.

Late Admission

Candidates may be admitted up to 60 minutes after the timed portion of the examination has begun, however, no additional time will be given. Candidates arriving more than 60 minutes after the examination has begun will not be admitted.

Security

During test administration, candidates are not permitted to discuss or remove examination materials from the testing site at any time. Candidates are prohibited from sharing materials or communicating with one another during the examination. Writing on any material other than supplied examination materials is prohibited. All examination booklets and related materials are copyrighted by the Board for Professional Engineers and Land Surveyors, and are confidential. The Board is committed to maintaining the security and confidentiality of all examination materials and data during every phase of development, program implementation, and storage.

Business and Professions Code Section 123 prohibits candidates from “obtaining examination questions or material, except by specific authorization either before, during, or after an examination; or using or purporting to use any examination questions or materials which were improperly removed or taken from any examination for the purpose of instructing or preparing any applicant for examination.” This includes any unauthorized discussion regarding specific problems or concepts included on the exam with *any other person* after the exam. The only exception to this is discussing the exam with Board staff when submitting an appeal or a comment regarding the examination.

The Board strictly enforces examination security. Conduct that results in a violation of security or disrupts the examination will result in the confiscation of the candidate’s examination and will result in the removal of candidate from the testing site. Such conduct may also cause the candidate to be barred from future examinations, and could result in disciplinary action against the Civil license and the filing of criminal charges. In addition, the candidate could be held liable for actual damages and cost of litigation up to ten thousand dollars (\$10,000). See Appendix C, regarding examination subversion.

Failure to Appear for Examination and Postponements

Failure to appear for a scheduled examination will result in a forfeiture of the candidate’s fee and require submittal of a refile application.

Postponement of an examination is at the discretion of the Board’s Executive Officer, and is only granted under extenuating circumstances. Circumstances that may be considered reasonable cause for postponement include personal illness or injury, serious illness or injury of an immediate family member, work assignment outside the continental United States, or an accident or mechanical breakdown of the candidate’s vehicle on the morning of the examination. Postponement requests must be submitted in writing, and accompanied by supporting documentation that can verify the request. Requests must be submitted either prior to the examination date or postmarked within ten days after the scheduled examination.

Abandoned Applications

In the absence of special circumstances any of the following actions by an applicant for licensure shall be considered abandonment of the application, and shall result in cancellation of the application with no refund of the filing fee:

- a. Failure to provide additional information or references within ninety days following the mailing of a request by the Board’s staff; or
- b. Failure to complete that examination to which the application has been assigned within two years from the date of filing of the application; or
- c. Failure to appear for examination at the designated time and place unless a postponement has been obtained in accordance with Board Rule 446; or

- d. Failure to appear for examination at the designated time and place after having obtained two postponements.

Address Changes

Each person who is an applicant for or holder of, a certificate of license issued by the Board must file an Address Change Affidavit with the Board office within thirty days after changing addresses. An Address Change Affidavit has been provided in Appendix E.

The address of record of all licensees is available to the public on the Board's Internet web site. If you do not want your home address made public, you may want to change your address of record to your business address or post office box.

Review Courses

The Board does not endorse any review course or material provided as study aides. If you are interested in obtaining information on review courses, we suggest you contact your local university or professional engineering society.

Design and Multiple Choice Comment Form

As part of the examination program, the Board provides candidates a Comment Form as an effective way to identify and comment on multiple choice and/or design problems about which the candidate has concerns. A Design and Multiple Choice Comment Form is found in Appendix D. Additional comment forms will also be available at the exam site. Completed form(s) should be mailed to the Board no later than ten days following the examination to ensure consideration of the comment(s) prior to scoring.

Grading Process for Design/Essay Questions

Design/essay problems are solved through calculations, written answers, and graphic presentations completed by the candidate in designated solution booklets. Each design solution completed by a candidate is graded independently by at least two licensed Geotechnical Engineers. Discrepancies in the two graders' findings are resolved through further grading by a third engineer. Solutions are graded without knowledge of the candidate's name or the scores assigned by other graders.

Graders are trained to apply explicitly established scoring criteria and performance standards for each design problem and solution. The scoring criteria and grading plans are developed by licensed Geotechnical Engineers in conjunction with the development of the design items. The grading plans, like the items, are based on the current test plan.

Points are assigned to the problems, and to the grading elements¹ within problems, according to their weight as designated by the test plan. The predetermined point values are awarded for each grading element correctly addressed in a candidate's solution booklet. Partial credit for a grading element is not allowed.

To obtain maximize points, candidates must show all work, including all formulas and calculations when specified and cite references where specified. Reference must include title, author, edition/date, page and figure number, if applicable. Acceptable references are those included on the 2003 Geotechnical Reference List (Appendix B), legal statutes or published material relating to the practice of California Geotechnical engineering. Class notes, tapes or other unaccredited, unpublished materials are **not** acceptable citations.

Some problems may require a specified number of answers. Candidates must provide **only** the number of answers required. Any answers provided beyond the number required will **not** be graded. To maximize answer points, avoid duplication in the answers. To obtain credit when requested, candidates must also provide explanations/justifications for each answer.

Grading Process for Multiple Choice Questions

Candidates use a machine-scoreable answer sheet to record their answers to the multiple choice items of the examination, which is then scanned for scoring. Candidates do not receive credit for a question if they marked more than one answer, if they do not mark an answer, or if they mark an incorrect answer.

The point value of each multiple choice question will be printed in the test booklet as an aid to the candidate. However, after initial scoring, any question that does not meet statistical criteria, or that is found to have a content problem, may be deleted.

In the event of deletion, the point value of the deleted question either becomes zero for all candidates or points will be awarded to all candidates. In this way, no candidate's score is affected by a deleted question.

Final Results

The cumulative total of points awarded for a candidate's performance on the multiple choice and design portions of the examination is the basis for determining if the candidate has achieved the minimum passing score.

Examination results are mailed to the candidates approximately fifteen weeks after the examination. Results will not be given out by phone until ten days after they are mailed. You may also check the Board web site for updated information.

¹A grading element may be the correct identification of a problem data or criteria, a correct equation or formula, a correct reference, or some other component of the problem requirement.

The examination application fee does not include the license fee. Candidates passing the examination are licensed for a minimum of three months. Immediately prior to expiration of that license, the new licensee will receive a renewal notice from the Board. A license is valid as long as the renewal fee is paid and the license has not been suspended or revoked.

Examination Appeals

Candidates who fail the examination and are **within 15% of the passing score** may appeal their performance on **design problems only**. Multiple-choice items may not be appealed. Candidates must review their examination to appeal their results. Dates, times, and locations for review/appeal sessions will be determined by the Board and this information will be included with the result notices for failing candidates.

Within twenty-one days from the date of the result notice, candidates must submit their request to review/appeal and the appropriate review/appeal fee. At the review/appeal session, examinees will be given a copy of the examination problems, their own solutions, and a copy of the scoring report.

The scoring report **will not** include solutions to the problem, but will identify the elements within a problem requirement for which points are assigned, and possible point values of each element.

Appeals must be submitted on the appeal forms issued at the review/appeal session at or before the time the review/appeal session concludes.

An appeal must contain a comprehensive, coherent, and plausible explanation of how and why the original response to the problem is correct in order to be forwarded for regrading. New or additional information will not be considered. Only an explanation regarding the original response provided during the examination will be considered. Appeals that do not meet the Board's established criteria for regrading will be denied.

Appellants who have not received their appeal results by the final filing date of the next examination and who wish to take the subsequent examination will be required to submit a refile application. There will be no extension of the final filing date granted. Appellants who obtain their licensure on appeal will be refunded their appeal fee. Candidates who attend the subsequent examination while waiting on their appeal results will **not** receive a refund. Candidates who **do not** wish to attend the subsequent examination after submitting their refile fee, must request a postponement (according to the guidelines outlined in Board Rule 446) or they will forfeit their refile fee.

Refile Application

An applicant failing an examination may be examined again by returning the refile notice included in the result letter, and the payment of the application fee within the specified period of time. The fee for refile is the same as the original application fee.

Examination Development Information

Licensed Geotechnical Engineers with content expertise and exam development experience participate in the development of an examination that meets the highest standards for exam construction and which is a reliable measure of geotechnical engineering practice. The following is an overview of the examination development process.

Test Plan

The test plan for a licensing examination is the vital link between the test and professional practice. It defines the content of the examination by identifying the subject-matter areas to be covered and by establishing the relative emphasis each content area should be given. Test plans are developed based upon the results of a job or occupational analysis. Typically, an occupational analysis is conducted every five to seven years and test plans are updated accordingly to ensure that they reflect actual tasks performed by licensed Geotechnical Engineers.

In 2001, an occupational analysis was conducted for Geotechnical Engineers. A committee consisting of a diverse group of California-licensed Geotechnical Engineers developed a survey consisting of statements describing the tasks and knowledge related to competent entry-level geotechnical engineering practice. This survey was distributed to all of the approximately 1,044 California-licensed Geotechnical Engineers residing in the state. The survey respondents' ratings were analyzed and used to develop the new Geotechnical Engineer Examination Test Plan. The first examination developed under the new test plan was administered in October 2002.

Examination Development Processes

Examination Development Conference

The Examination Development Committee, comprised of licensed Geotechnical Engineers, convenes to review the test plan and outline the development of a new examination. Through the review of performance data for previously used items, the committee develops new items and selects and revises items from the existing item bank for inclusion in the new examination. Grading plans are developed or revised to be used in the scoring of the examination.

Examination Review/Weighting Conference

The Examination Development Committee reconvenes as a group to review and refine items selected and developed for the new examination, to further develop grading plans and to assess the adequacy of time allotted to complete the exam. The committee assigns point values to each item and ensures that all test plan areas are appropriately covered on the exam.

Field Testing/Board Review

Newly licensed Geotechnical Engineers are recruited to take a draft version of the newly written examination under simulated test conditions. After completing each item, the field testers answer a set of questions about each item's clarity, difficulty, importance, and the time needed to answer. The field testers then respond to a questionnaire about the overall exam content, any subject areas that should have been covered but were not, and any areas that were covered but were unnecessary or overemphasized. Field testers are also asked about the adequacy of time, depth and difficulty of the Geotechnical Engineering Examination Field Test compared with the one that they passed.

This critical phase of the examination review process may reveal ambiguities in the wording of an item, elicit an acceptable alternate response, disclose unanticipated response patterns, or address time issues. Any of these may require further refinement of the item before the exam is finalized.

Setting a Pass/Fail Standard

Because each examination is considered independent of any previous administration and levels of examination difficulty may vary, the Board adopts a criterion-referenced passing score. A criterion-referenced passing score applies minimum standards for competent practice to all candidates regardless of the form of the examination administered.

A group of licensed Geotechnical Engineers representing a demographic diversity of the geotechnical engineering profession convenes after the examination is administered and graded to determine the pass/fail standard for the examination.

In general, a modified-Angoff method is used for multiple-choice questions and a pass/fail method is used for the design/essay questions. The Angoff procedure requires the Geotechnical Engineers (the judges) to estimate the proportion of borderline candidates who would answer each item correctly.

The pass/fail standard for the exam is obtained by averaging all of the judges' ratings. The overall pass/fail standard is obtained by summing the results of each test section (multiple choice and design/essay).

The pass/fail standard is established to distinguish between those candidates whose performance equals or betters the requirement for minimum acceptable competence in the area of geotechnical engineering. The concept of "minimum acceptable competence" is defined at each standard setting meeting to ensure that participants have a common frame of reference for assessing minimum competence for the entry-level geotechnical engineer.

Throughout the entire cycle of examination development and grading, numerous licensed Geotechnical Engineers review the examination. This exposure helps to ensure the validity and reliability of the examination and the discovery of any flaws that may exist in an examination before it is administered.

Levels of Item Complexity

There are four levels of thought processes that can be applied in constructing test items. They are, in order of increasing level of complexity: knowledge, comprehension, application, and analysis. A description of each level follows:

Knowledge-Level Requirements – Knowledge-level items require that candidates remember information that they have previously learned. The key feature of this type of item is that the candidate need only recall information and indicate the correct choice. Because professional practice entails much more than the recall of information, it is recommended that items be developed to test competencies above this level.

Comprehension-Level Requirements – Comprehension-level items require the candidate to demonstrate an understanding of information. This can be done by requiring the candidate to identify a concept or a principle that is presented in the item by an indirect or implicit means, or by requiring the candidate to elaborate in his or her own words on the similarities, differences, and implications for practice with respect to a number of concepts or principles.

Application-Level Requirements – The application-level of testing goes another level beyond a candidate's ability to use knowledge in a given situation. It tests the candidate's ability to understand information and to demonstrate the correct use of this understanding in various situations.

Analysis-Level Requirements – Analysis-level items require the candidate to critically evaluate information, to identify and weigh the strengths and weaknesses of procedures, to interpret technical data and derive a conclusion, and entails an assessment of the implications of actions including the consideration of contingencies for failures or complications.

Candidates are required to demonstrate comprehension, to apply their knowledge, and to analyze situations whenever possible. Every effort is made to develop practice-related test problems at the higher cognitive levels (comprehension, application, and analysis) and to limit the number of knowledge-based items.